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Opioids and the Built Environment: A Study of Mason City's Built Environment

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Opioids and the Built Environment: A Study of Mason City's North End Neighborhood

By

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INTRODUCTION

Many factors affect one's health and wellbeing. Genetics, nutrition, physical activity, mental health, and physical environment contribute to one's overall health as well as one's behaviors and decisions. This paper specifically explores how the conditions of one's physical environment affects their health. For instance, one who lives in a neighborhood that has parks and trails might be more likely to utilize these and thus be a healthier individual overall. By contrast, one who lives in a neighborhood that has poor sidewalk connectivity and no nearby parks might be more car-dependent and thus in poorer health overall. The relationship between the built environment and physical health are not new for professional planners and public health experts to consider. However, the relationship between the built environment and substance misuse is one that professional planners and public health experts have just begun to examine. Since it has been widely-accepted that the characteristics of the built environment can, indeed, affect one's physical health and wellbeing, it is deserving of further examination if the built environment can contribute to one's experience with substance misuse (and thus overall health).

In this research, the characteristics of the built environment are explored as they relate to one's experience with opioid misuse. Opioids have become increasingly deadly in the United States, and the solution to curb overdose deaths should not only be framed from the medical or policy sides of the issue. Rather, the professional shapers of and responders to the built environment have a responsibility too. Hence, the following research questions are posed in this paper: **1.** ***What is the relationship between the built environment and the opioid epidemic?*** and **2.** ***How can planners respond to the opioid epidemic in their communities?*** The

first research question is answered through the review of existing academic literature about the topic. The second research question is answered through the qualitative analysis of one census block group in Mason City, IA's North End Neighborhood.

CHAPTER 1: OPIOIDS & THE BUILT ENVIRONMENT

1.1: Opioid Misuse

1.1.1: What is opioid misuse?

The United States has suffered thousands of deaths from opioid misuse, referred to as the "opioid epidemic," over the last two decades. When the number of cases of a disease in a community suddenly increases above the expected level (the baseline or endemic level) it is considered to be an epidemic (CDC 2010). According to the Centers for Disease Control and Prevention, "[e]pidemics occur when an agent and susceptible hosts are present in adequate numbers, and the agent can be effectively conveyed from a source to the susceptible hosts" (CDC 2012)." Examples of epidemics include the plague, cholera, Spanish flu, and Ebola. An important distinction regarding the opioid epidemic, however, is that it does not presume an "infectious agent" is being spread like viruses, bacteria, fungi, or parasites. Rather, opioid misuse has become an epidemic because it has reached "epidemic proportion" in the United States. The Centers for Disease Control and Prevention (CDC) estimate that in 2017 the number of overdose deaths in the United States involving opioids was 6 times higher than in 1999 (CDC, 2018). As such, opioid misuse was not considered an epidemic until the mid-2010s. Addiction to opioids was largely characterized as a moral or psychological issue that many argued could be eradicated "…if [users of opioids] simply tried hard enough or if they had the best-available counseling or pharmaceutical services" (Newton 2018, p. 43-44). However, this is

now an outdated characterization because research has clearly evidenced that ongoing opioid use can result in changes to the brain's homeostasis (maintenance of balanced functions) and allostasis (ability to adjust to changes) (Newton, 2018, p. 44). Thus, it is unjust to minimize opioid addiction as a personal failing and discredit the deeper implications of one's physical and mental state that have been altered from opioid use.

It is imperative to note that opioid "addiction," "dependence," "abuse," and "misuse" are not interchangeable terms. Opioid addiction occurs when there is a long-lasting and recurring psychological and/or physiological need for using opioids that generally results in permanent or long-lasting changes in the neurochemistry of the brain (Newton, 2018, p. 335). Opioid dependence occurs when an individual develops a fixation or craving for opioids that is not as severe as classified addiction but may require professional help to overcome (Newton, 2018, p. 336). Opioid abuse occurs when opioids are used specifically to produce a psychotropic (affecting one's mental state) rather than to treat a medical condition (West, et. Al., 2015, p. 118). According to the CDC, the preferred term that summarizes opioid addition, dependence, and abuse is opioid use disorder (OUD). OUD is "[a] problematic pattern of opioid use that causes significant impairment or distress" that is diagnosable from specific criteria like unsuccessful control of use, social problems, or failure to fulfill work, school, or home obligations (CDC web). Finally, opioid misuse occurs when the substance is taken at a higher dosage or for a longer duration than prescribed (West, et al., 2015, p. 118). Opioid misuse is the term used throughout this paper to characterize the opioid epidemic because it is somewhat of an umbrella term for both lawful and illicit opioid use that has become detrimental.

The opioid epidemic is the result of medical prescriptions for opioids that sharply increased in the late 1990s, which soon established a market for nonmedical or recreational opioid use, and then led to nearly three million new users by 2012 that suffered from addition, overdoses (fatal and non-fatal), and a number of other health difficulties (Bonnie, Ford and Phillips 2017). It is not the number of users that make opioids so dangerous, but the number of deaths associated with their use. There are three observable waves of opioid overdose deaths in the United States: the late 1990s to 2010 is defined by a dramatic increase in prescription opioid (hydrocodone, oxycodone, oxymorphone, morphine, Percocet, and codeine) deaths; the period 2010 to 2017 is defined by a steep rise in heroin overdose deaths; and 2013 to the present, which is defined by an exponential rise in synthetic opioid (fentanyl – often cut into other illicit drugs, carfentanil, and U4) deaths (CDC, 2018). Opioid misuse cannot be realistically eradicated, but it is possible to recognize, track, and mitigate the effects of opioid misuse that negatively affects public health.

Opioids are drugs naturally derived from the opium in poppy plants or chemically produced that act as a pain reliever or relaxant. These drugs are used for pain management for the recovery of medical procedures like dental extraction (intended to be used for a short duration) or the treatment of chronic pain patients. Because of the euphoric feeling they generate, opioids are highly addictive (Peters, Miller and Hochstetler, 2019). Moreover, regular opioid use physically changes one's nervous system - the brain becomes physically dependent on the opioid drug and may require more doses per day than originally necessary. In some cases, opioid misuse has produced structural changes to the human brain that may be irreversible or require intense medical treatment (Newton, 2018, p. 43). Therefore, opioids are

highly risky drugs that health professionals must continue to research and monitor so that they may be used without such a comprehensive range of harmful effects.

Many medical professionals, emergency departments, first responders, public health and safety officials, mental health and substance abuse treatment providers, community organizations, and community members have addressed opioid misuse in their communities by way of awareness, resources, and expert education over all three waves of the opioid epidemic (CDC, 2018). However, there is still much work to be done to prevent opioid-related deaths in the United States, as the number of related deaths is still climbing in many areas with an established opioid problem and beginning to climb in areas that did not previously have an opioid problem. Because one opioid-related death is one too many, states with low or stable overdose deaths should monitor the possible impacts of opioids in their communities. This awareness could lead to better prevention strategies that stop the rise of opioid misuse in communities.

1.1.2: Where are opioids misused?

Assessing the spatial distribution and characteristics of opioid misuse and related deaths is an essential component of combating this crisis effectively. Unpacking the geographic, social, economic, and health conditions in areas with high numbers of opioid-related deaths has the potential to reveal causes and consequences of opioid misuse, and unpacking these conditions in areas with low numbers of opioid-related deaths has the potential to reveal strategies for discouraging opioid misuse (Peters, Miller, & Hochstetler, 2019). Current scholarship about substance misuse in the United States has largely focused on urban areas; far less attention has been explored about this subject in small-town or rural settings. Historically, drug use has been

understood as an urban problem, but this perception has become problematic since substance use and overdose deaths have shifted to small town and rural areas (Crawford, et al., 2019). The geographical location of communities impacted by the opioid epidemic is distributed across all regions of the United States, differing in the severity, as indicated by high numbers of opioid-related deaths, and time (first, second, or third wave of the opioid epidemic). Communities characterized as rural, white, and economically disadvantaged with high-injury industries (e.g. construction, transportation and warehousing, agriculture, manufacturing), no drug enforcement, and poorer social capital may be considered "high" opioid crisis areas (Peters, Miller, & Hochstetler, 2019). Although effects of the opioid epidemic have been observed in every sociodemographic group, it has disproportionately harmed vulnerable populations such as those in economically depressed areas of the nation (Bonnie, Ford and Phillips 2017). Since the year 2000, the Midwest and Northeast regions have experienced the most significant increases in opioid-related deaths. Opioid deaths overall are low and stable in the state of Iowa compared to surrounding states, but synthetic and heroin deaths are rising (Peters, Miller, & Hochstetler, 2019).

1.2: Connection to the Built Environment

1.2.1: What is the built environment?

According to the CDC, the built environment includes all of the physical parts of where we live and work (CDC 2011). This includes the buildings, roads, sidewalks, utilities, homes, transit, fixtures, parks, and all other human-made entities that form the physical characteristics of a community: "The built environment can impact human health by affecting rates of physical activity, air pollutants such as ozone and particle matter that can exacerbate asthma and

respiratory disease, and emissions of carbon dioxide that contributes to climate change" (CDC 2015). For instance, low-density development, single-use zoning, or poor or nonexistent sidewalks or trails may contribute to an individual's decision to drive rather than walk to their destination. Over time, this habit could develop into detrimental health conditions for the individual (low level of physical activity) and the broader community (high level of carbon emissions). Similarly, insufficient connectivity within a community has the potential to cause individuals to become not only physically isolated, but socially isolated. Prolonged isolation can diminish an individual's health, whether physical or social. In short, the conditions of the built environment contribute to better or worse health outcomes in a community.

According to the American Planning Association (APA), "The goal of planning is to maximize the health, safety, and economic well-being of all people living in our communities (American Planning Association). Additionally, the APA contends that "…a planner's job is to work with residents and elected officials to guide the layout of an entire community or region. Planners take abroad view and look at how the pieces of a community – buildings, roads, and parks – fit together […] then make recommendations on how the community should proceed" (American Planning Association). One of the most traditional ways that planners make a difference in a community is through the spatial organization and regulation of land. The built environment is, of course, part of the land that planners organize and regulate, and assessing its conditions is crucial. The purpose of evaluating a community's built environment is to establish baseline conditions, identify needs and priorities for improvement, and collect data to assess changes over time (CDC 2015). This process involves a number of other stakeholders that help make decisions that shape a community's built environment and its conditions, like

engineers, developers, service providers, public officials, and residents. However, there is no "one-size-fits-all" approach for measuring these conditions since every community is fundamentally unique.

The built environment includes physical elements that are influenced by a multitude of factors that are difficult to quantify, such as individual perceptions, social customs, political and economic conditions, and laws and regulations. A variety of data collection and assessment tools thus exist to measure the built environment, which are specific to the type of features, behaviors, and outcomes under analysis. Generally speaking, features of the built environment are measured using three categories: 1. Questionnaires that gauge perceptions, 2. Tools like GIS that collect and spatially analyze existing data, and 3. Systematic observation or audit tools (CDC 2015). Researchers must select a method of measurement that best suits the data collection needs for their specific project area's goals with the caveat that there will be features of the built environment that are not assessed equally by each method. The collection and analysis of this data may be used to better inform decision-makers about the impact of the built environment's conditions on the overall health of the community.

Many aspects of the built environment can manifest negative health outcomes in a community, so it is imperative that communities utilize design standards and land use best practices that promote healthier lifestyles. The CDC recognizes several health issues that are linked to these areas of the built environment, including accessibility, children's health, older adults' health, gentrification, health impact assessments (HIAs), injury, mental health, physical activity, respiratory health and air pollution, social capital, and water quality (CITE – HI fact sheet). There are certainly health issues that are also linked to the conditions of the built

environment that have not been listed, but accessibility, HIAs, injury, mental health, physical activity, and social capital are notable in regard to manifestations of substance misuse in the built environment.

Accessibility is the ease of movement about the community, and it is directly affected by disabling conditions and environmental barriers. HIAs evaluate the potential health effects of a project or policy before it is built or implemented, which can help minimize adverse health outcomes and bring public health issues to the attention of decision-makers in areas outside of the traditional scope of public health (e.g. land use). Injury may be reduced by safer community design, especially in the realm of transportation planning. Mental health is conditioned by the choices made by an individual as well as the availability of opportunities that influence their physical and mental health, and community design plays a role in this. Physical activity and inactivity, which improve or worsen an individual's health and well-being, can both be a product of community design. Lastly, social capital is the time and energy of individuals and the community as a whole for improvements, networking, engagement, recreation, and other social bonding activities; this may be encouraged or hindered by community design (CDC 2015).

1.2.2: How does substance abuse manifest in the built environment?

There exists a significant extent of scholarship about the relationship between substance use, injection-risk behavior, and HIV transmission as it related to the built environment (Crawford, et al., 2019). "Broken windows" and risk environment theories describe how visible decay in a neighborhood results in crime and disorder. To be more precise, broken windows theory suggests that "…if a window in a building is broken and is left unrepaired, all the rest of the windows will soon be broken. This is as true in nice

neighborhoods as in rundown ones" (Kelling & Wilson 1982). This theory implies that the physical features of the environment alone can influence an individual's behavior in that space. However, substance misuse is more adequately contextualized by both the physical features of a space and the non-physical features of a space and the individual inhabiting it. According to Cerdá:

> "Of particular interest in the urban context are the features of neighborhoods that can shape drug overdose. Established conceptual frameworks suggest […] primary determinants of infrastructure, employment, education, and health care resources, including residential segregation, income distribution, and neighborhood deprivation, and secondary determinants that are consequences of these fundamental conditions […] may mediate their impact on drug use, including the quality of the built environment, social norms around drug use, and family fragmentation" (Cerdá, et al 2013).

Recognizing this, the National Institute of Justice (NIJ), an agency within the United States Department of Justice, has sponsored crime prevention research intended to make neighborhoods safer since the 1980s. Crime Prevention Through Environmental Design (CPTED) is a neighborhood-based strategy that acknowledges that the design and management of the physical environment of buildings, residential neighborhoods, and business areas may be used to increase public safety and reduce fear of crime (Travis 1999). Local government officials and community members can use CPTED to increase security and discourage drug use, which is more apparent in blighted and rundown areas. Local planning departments in particular can use building codes and inspection enforcement to increase the security of a neighborhood through its human-made features; however, the natural features of a neighborhood also contribute to promoting safer, more livable communities in which substance misuse is discouraged (Travis 1999). Thus, it is reasonable to suggest that features of the built environment are linked to opioid misuse.

1.3: Research Model: The Heart of Kensington in Philadelphia, PA

The Heart of Kensington is a neighborhood community in northern Philadelphia, PA that was known historically as "The Workshop of the World" due to its dense collection of industrial factories. When businesses closed and eliminated jobs in the mid-twentieth century, Kensington's severe decline into sustained poverty began (Interface Studio 2017). The challenges produced by harrowing unemployment and disinvestment were magnified by the neighborhood's struggles with the opioid epidemic. By 2016, Kensington was considered one of the deadliest areas in the nation in regards to opioid-related overdoses. As Percy describes:

> "People cleared needles off their lawns, their front steps and the sidewalks where their children played. […] They organized cleanups, lobbied City Council members and state representatives and asked for help from church groups, but the problem seemed insurmountable. The drug market, institutional racism, joblessness and the ravages of the war on drugs in the '80s left the community struggling" (Percy 2018).

The trauma in Kensington was so deeply ingrained into the experience of its residents that Philadelphia Mayor Jim Kenney made tackling the opioid crisis a priority. A task force of addiction experts, doctors, social workers, and D.E.A. agents developed a plan to reduce overdose deaths in Kensington in 2017, which inspired other organizations to join the fight too (Percy 2018).

Figure 1: Street scene in Kensington neighborhood of Philadelphia, PA

Source: Tim Tai for *The Philadelphia Inquirer*

Figure 2: Persons injecting themselves with drugs in Kensignton neighborhood of Philadelphia, PA

Source: Jeffrey Stockbridge for *The New York Times*

Impact Services, a community-based collective, has been working in the Kensington neighborhood of Philadelphia since 1974 to help residents with employment, housing, and community initiatives. Impact's growing community development programs led to the development of The Heart of Kensington Collective Impact 2022 Comprehensive Neighborhood Revitalization Plan in 2016, a participatory collaboration between local experts, stakeholders, and residents designed to provide a platform to engage in meaningful conversations that establish a vision for the future of the neighborhood specifically in response to the area's collective trauma. The intention of the plan is to be a tool for anybody working toward its shared vision, and the strategies outlined are practical in their approach to achieve the desired outcomes. The plan included a parcel-by-parcel survey of every property in the neighborhood, collecting detailed information about each parcel's physical condition, physical observations about block trends, key assets and anchors, and problem areas that require special attention.

Figure 3: Community participation event for Heart of Kensington Plan

Source: Interface Studio 2017

Figure 4: Example of Focus Zone from Heart of Kensington Plan document

Source: Interface Studio 2017

Figure 5: Example Focus Zone projects from Heart of Kensington Plan document

Source: Interface Studio 2017

The plan used Trauma-Informed Community Development (TICD) to guide the recommendations developed from the background research and existing conditions analysis. TICD is a strengths-based approach to building community resiliency. TICD involves the three-pronged framework: 1) realizing the prevalence of trauma, 2) recognizing how trauma affects individuals and communities, and 3) responding by putting this knowledge into practice. According to TICD:

> "Trauma refers to extreme stress that overwhelms a person's ability to cope. It can be a single event, a series of events, or a chronic condition such as childhood neglect or domestic violence. It is also produced by structural violence, such as segregation, food and housing insecurity, and poverty, which are systemic problems faced by millions of children and adults" (Interface Studio 2017).

Just as individuals can experience trauma, so too can communities. Entire neighborhoods can be disrupted when symptoms of trauma manifest at the community level. These symptoms are present in the social-cultural environment (the people), the physical/built environment (the place), and the opportunities afforded in the economic and educational environment (equitable opportunity) (Interface Studio 2017). Trauma does not need to exist as a disruption in a community, however. Trauma can inspire communities to build upon their strengths, improving their safety, health, and resiliency for the future.

This plan also included "Elements of a Healthy Community," which are subject areas that could be attributed to specific components of the built environment: Health & Safety, Education, Economic Development, Housing, and Community (Interface Studio 2017). These elements were assigned to prioritized focus zones, which are specific sites within the study area that could support the implementation of the recommendations to demonstrate the plan's

vision and goals. Each focus zone had a shortlist of projects that further the Elements of a Healthy Community. For example, McPherson Square was selected as a focus zone with five projects. One of the projects is "Vacant Lot Stabilization – Clean and Green," and it addresses the Health & Safety, Economic Development, Housing, and Community Elements of a Healthy Community (Interface Studio 2017). This organization is thorough and utilizes a variety of intervention strategies in each focus zone to increase the likelihood of successful implementation. The number of opioid-related overdose deaths in this area was highest at 1,217 in the year 2017, and it has since fallen only slightly: there were an estimated 1,116 opioid-related overdose deaths in both 2018 and 2019 (Whelan 2020). Still, the opioid crisis continues to plague Kensington. Pennsylvania's Governor Tom Wolf stated in a 2019 interview that although deaths are decreasing, opioids continue to be a major concern for the city of Philadelphia, so "…we just need to keep working on this" (Kramer 2019). The Heart of Kensington Collective Impact 2022 Comprehensive Neighborhood Revitalization Plan is one such way to continue this progress, which will be a long process. The plan is a commendable model for a neighborhood plan specifically concerned with the relationship between substance misuse and the built environment. Applying this framework to the study area identified in Mason City, IA is intended to provide useful information to the community for how to address their community trauma in a similar fashion as the Kensington model.

CHAPTER 2: MASON CITY, IA & OPIOIDS

2.1: Mason City Background

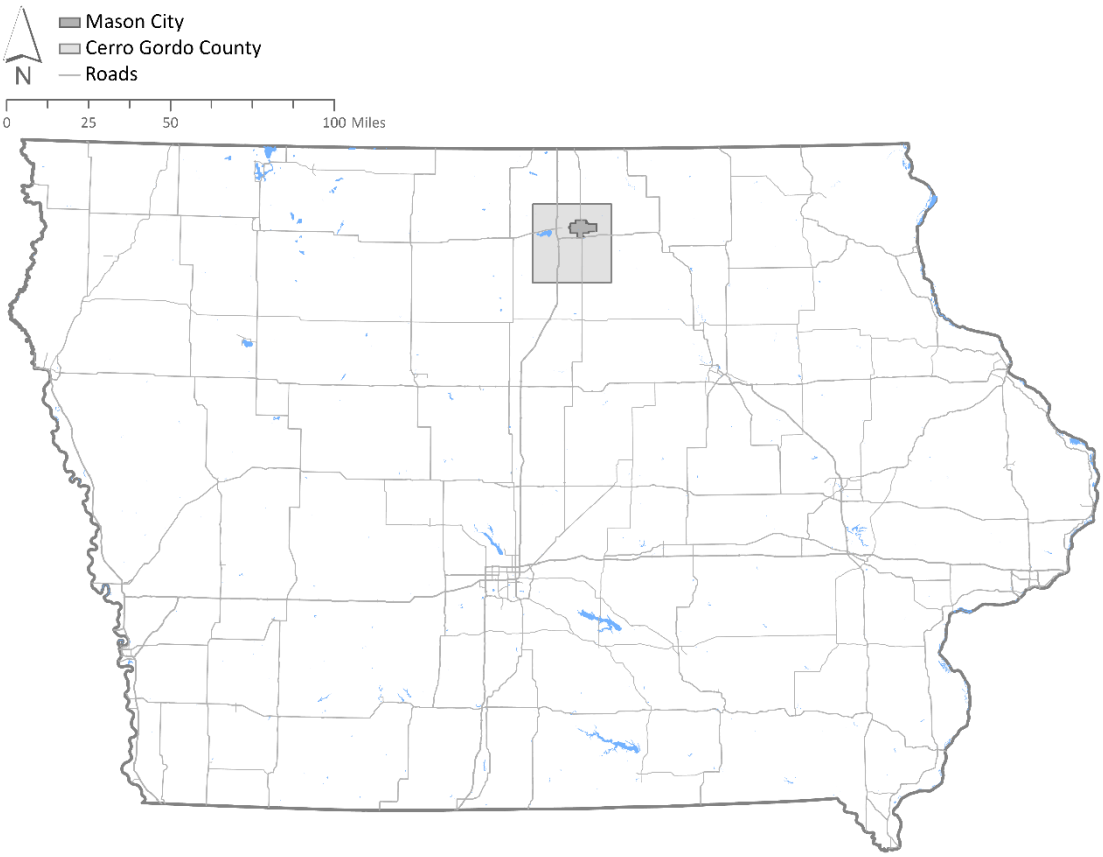
2.1.1: Overview of Mason City Context

In order to select a study area for this research project, the county data available about opioid use and deaths was reviewed. From this, Cerro Gordo was selected as a county that has suffered an increase in opioid misuse during the identified study years of 2013-2017 that was also in close proximity – this was an important criterion for selecting a site because in-person site visits were desirable and traveling funds were limited. The study area was then narrowed further to Mason City because it is the largest city within the county. This decision was made assuming that more data would be available, and more characteristics of the built environment would be observable in a developed urban area than a smaller, more rural town. Then, the North End neighborhood of Mason City was reviewed after conversations with local officials and the discovery of a plan developed by former graduate students. Together, this narrowed the study area to one census block group in the North End.

Mason City (Fig. 6) is a mid-size city of over 27,000 residents in north central Iowa along Interstate 35 that serves as the county seat for Cerro Gordo County. The population of the city and county have each decreased by 2.6% between 2010 and 2017. The population is predominantly White (93.8% in 2010) and young (76.6% are below age 44), but just over one-third of residents age 16 and above are not in the labor force (34.6%). The median household income ($47,273) in the city is less than the county ($50,569), and the educational attainment (21.0% with Bachelor's Degree or Higher) is also less than the county (22.2%). Most of the housing in the city is occupied (91.9%), of which 63.0% are owner-occupied and 37.0% are renter-occupied. The majority of housing units were constructed before 1980. An estimated 14.8% of the city's population has a disability and 7.0% do not have health insurance (ISU Extension and Outreach 2020).

Cerro Gordo County is part of Iowa Workforce Development (IWD)'s Region #2 (composed of Winnebago, Worth, Mitchell, Hancock, Floyd, Franklin, and Cerro Gordo Counties), whose largest private industry was manufacturing (20.4% of the region's total employment) as of 2016 (IWD 2017). Additionally, IWD indicates that construction laborers and maintenance and general repair workers are "Hot Jobs" in Region #2, expected to increase annually from 2014-2024 (IWD 2017). These industries are considered high-injury because they workers in these industries face an increased risk to physical harm. Moreover, Cerro Gordo County is the largest labor force in Region #2, so it is implied that much of this employment will be within this county, suggesting that risk is higher here.

Figure 6: Study Area Context Map



Source: Aspen Pflanz

2.1.2: City and Study Area Profile

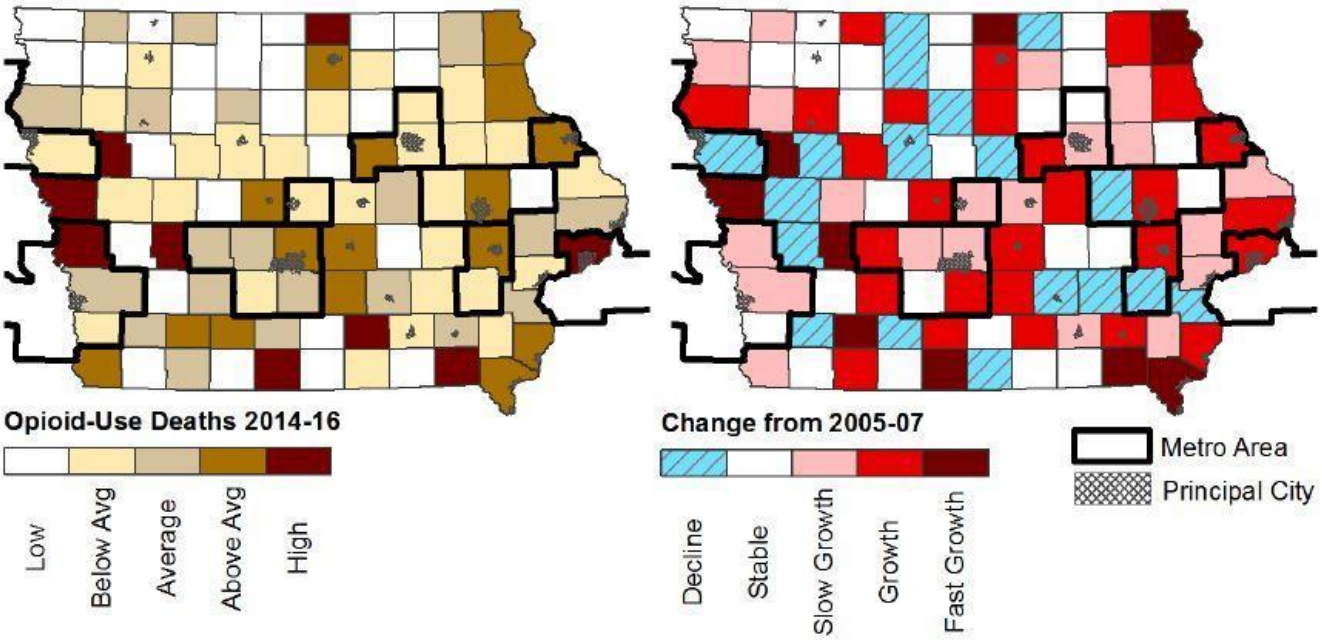
The study area identified for this research is one census block group in Mason City's north-end neighborhood. Block Group 5 was selected as the official study area from reviewing the area's history and planning initiatives. This neighborhood is where many manufacturing and industrial businesses operate in Mason City, such as Kraft Foods and Union Pacific Railroad, a characteristic that has been noted by scholars to correlate with opioid misuse. Additionally, University of Iowa planning students used this area (indicated as Block Group 3) of Mason City for the North End Healthy Neighborhood Plan, a comprehensive plan that outlines specific revitalization efforts for the neighborhood that address its industrial history, economic decline, and negative perception (Bochner, et al. 2018). Although it is not certain that opioids are being misused in this neighborhood, the area's characteristics suggest that it could benefit from improvements to the built environment that specifically target opioid misuse. Although the selection of this particular block group in Mason City's North End Neighborhood was somewhat arbitrary, it is important to now that the area was endorsed by local planning staff and a Cerro Gordo County public health official as a rational neighborhood to assess for this research topic.

2.2: Opioid Misuse in Cerro Gordo County

2.2.1: Presence of Opioid Misuse

According to a report published in 2019, opioid misuse in Cerro Gordo County has contributed to an above-average number of deaths in Iowa from 2014-2016 (Fig. 7). Furthermore, Mason City has been identified as one of the hardest hit metropolitans in the state for opioid-related deaths, along with Davenport, Harrison County (effectively a suburb in the Omaha-Council Bluffs metro), and Dubuque (Peters, Miller and Hochstetler 2019).

Figure 7: Opioid Use Deaths in Iowa 2014-2016 by County and Change from 2005-2007



Source: Peters, Miller and Hochstetler 2019

Because substance abuse-related data that is specific to the exact study area boundaries is not available, a 2019 needs assessment developed by the Cerro Gordo County Public Health Department for a Rural Communities Opioid Response Program (RCORP) Planning grant by the Health Resources and Services Administration (HRSA) is used to generally contextualize the presence of opioids and opioid misuse in the study area. Cerro Gordo County and its partners (Prairie Ridge Integrated Behavioral Healthcare, Mason City Youth Task Force, and MercyOne North Iowa Medical Center) were awarded a RCORP grant for $200,000 in May 2019 to "...support the development of the North Iowa Collaborative, a community-based team to analyze and assess the area's opioid and substance abuse issues, access to treatment and medical providers, and develop an in-depth strategic plan, Workforce Development Plan and Sustainability Plan to address opioid and substance misuse" in the area (Cerro Gordo County Public Health Department 2019). This needs assessment compiled qualitative and quantitative

data from the years 2014 to 2018 "...to build upon and gather data from as many sectors of [the] community as possible to truly 'paint the picture' of opioids and substance abuse in [the] area" (Cerro Gordo County Public Health Department 2019).

Data sources for the needs assessment included direct contributions from the local law enforcement, family treatment court, emergency services, local hospital behavioral health department, substance use treatment center, youth task force volunteers, and the 2017 Substance Use Needs Assessment survey. Other data sources included an expansion of the 2017 Prairie Ridge Integrated Behavioral Healthcare substance use needs assessment through a focus group of Service Area II Healthcare Coalition (regional group of local hospital, public health and emergency medical service representatives) and RCORP workshop participants. The collected data was organized into three categories: Prevalence, Prevention, and Treatment.

2.2.2: Scope of Opioid Misuse

The HRSA needs assessment from the Cerro Gordo Public Health Department was used to establish the scope of opioid misuse for the study area because it offers a comprehensive overview of substance misuse near the study area. The 2019 survey included in the assessment reported that 53% of respondents had experience with drug addiction either personally or through family members, and 21% of survey respondents have misused prescription medication ("misuse" defined in this survey as using the prescription for a purpose other than intended by the prescribing professional). Furthermore, 29% indicated that they first began misusing prescription medication between the ages of 22 and 30 (Cerro Gordo County Public Health Department 2019). The 2012-2018 Iowa Youth Survey indicated that 12-15% of Cerro Gordo County students have reported that people living in their home have a serious alcohol or drug

problem, which is consistent with state rates. 11% of Cerro Gordo Family Drug Court participants reported heroin/opiates as their primary substance used, 4% higher than the state rate of 7%. Similarly, 19% of participants in 2018 reported to use heroin/opiates, including secondary and tertiary use (Cerro Gordo County Public Health Department 2019).

2.3: Symptoms of Community Trauma and Study Area Indicators

2.3.1: Study Area Challenges

There are several symptoms of community trauma that are manifesting in the built environment of Mason City's North End neighborhood, as indicated in Table 1. Using the Heart of Kensington plan as a model, Community Components and Symptoms of Community Trauma offer broad trends that are recognizable in communities, such as disinvestment, and relate them to the specific context of the North End, such as vacant and dilapidated storefronts along N. Federal Ave. Identifying exact indications of community trauma in the North End equips planners with justification for intervention. If there were no indicators of community trauma, planners would have no rationale for the projects proposed in this research that are inspired by TICD. Furthermore, referencing the proposed projects back to the foundations of a community's structure (people, equitable opportunity, and place) connect the separate, individual characteristics of a community into a shared whole. This understanding is important for planners to communicate to the public, which perhaps considers community projects as isolated events rather than coordinated efforts reaching a greater objective or vision for the community.

Table 1: Community Components, Trauma, and Indicators in North End

COMMUNITY COMPONENTS	SYMPTOMS OF COMMUNITY TRAUMA	INDICATORS IN THE NORTH END NEIGHBORHOOD

PEOPLE **SOCIAL-CULTURAL ENVIRONMENT**	• *Disconnected/damaged social relations and social networks* • *Elevation of destructive, dislocating social norms* • *A low sense of collective efficacy*	**Population has declined since 2000 and is expected to continue to decline by 1% annually or stabilize.** **"Crime" or "drugs" are common words used to characterize the perceptions of the North End neighborhood.** **There is no active community organization dedicated to the North End neighborhood.**
EQUITABLE OPPORTUNITY **ECONOMIC AND EDUCATIONAL ENVIRONMENT**	• *Intergenerational poverty* • *Long-term unemployment* • *Relocation of businesses and jobs* • *Limited employment* • *Disinvestment*	**There are several vacant and dilapidated storefronts that have contributed to the neighborhood's poor aesthetic quality.** **Only 4% of the developed land in the North End is commercial space, which is currently underutilized and less than the City's (9%).** **The number of households under the poverty level have increased since 2000.**
PLACE **PHYSICAL/BUILT ENVIRONMENT**	• *Deteriorated environments and infrastructure* • *Dangerous public spaces* • *Unhealthy products*	**Households have a higher percentage of vacancy than the City.** **Nearly 20% of the City's overall "white-tagged" properties (nuisance properties that decrease aesthetics and housing values of surrounding homes) are in the North End.** **Most intersections lack pedestrian crossing infrastructure though the traffic volume on the North End's main arterial roads is high.** **Street lights are absent on most streets, except at intersections.** **Three gas stations, two liquor stores, and a tobacco shop are located in the North End.**

Sources: Interface Studio 2017 and Bochner, et al. 2018

CHAPTER 3: METHODOLOGY & STUDY AREA INTERVENTIONS

3.1: Justification for Research

There is a lack of existing research about the relationship between the profession of planning as it relates to the conditions of the built environment and an individual's

susceptibility to substance misuse. This report attempts to help narrow this gap in the literature, specifically as it relates to the increasing severity of opioid misuse, a form of substance abuse, in the United States. Opioid misuse has been characterized as an "everything problem," meaning that it cannot be considered as solely a medical, policy, personal, or societal issue. Planners are tasked with maintaining the health and well-being of their communities, which includes acknowledging and acting on the issue of opioids. What planners can contribute to the fight against opioid misuse as professionals must, of course, be related to the organization and regulation of land and its use. Hence, planners can assess the conditions of the built environment in areas that are impacted by opioid misuse and use their professional knowledge and duties to mitigate it.

Why the built environment? Planners are, of course, responsible for more than the organization and regulation of land, which is certainly tied to the built environment, but they are not the sole party responsible for the conditions of the built environment. Architects, landscape architects, urban designers, engineers, and developers, to name a few, are also responsible for these conditions. Even the inhabitants of the built environment – whether they are residents or passersby – affect these conditions. The built environment is something we can see, touch, and experience as community members, which can have more of an impact on our behaviors in and interactions with the neighborhood. Focusing planning efforts first on the tangible parts of a community rather than the intangible is intended to serve as a catalyst for other neighborhood improvements that may require more time, effort, or coordination. For instance, fixing sidewalks or eliminating dead ends in a neighborhood does not need a coordinated education effort -- citizens know that if there isn't a dead end, they can get from

this side of the neighborhood to the other. There is a project, not a program, which accomplished this. The intended outcome of this hypothetical neighborhood action plan for North End is to provide concrete examples that evidence improved neighborhood conditions that will likely lead to better Health and Safety, Economic Development, and Community Cohesion, all of which are components for mitigating opioid misuse.

3.2: Research Methodology

This research poses the following research questions: **1. *What is the relationship between the built environment and the opioid epidemic?*** and **2. *How can planners respond to the opioid epidemic in their communities?*** Both research questions are answered in this research project with primarily qualitative analysis and minor quantitative analysis. In order to answer the first research question, a review of existing literature and previous studies, and a successful case study was used. The second research question was answered by systematic observation within a specified study area, review of previous studies, and reviewing a variety of best practices for healthy neighborhood planning.

The study area was selected by reviewing public health data that reported opioid-related deaths in Iowa, specifically from the years 2013 to 2017. There is no baseline of opioid-related deaths that determines whether or not opioid misuse is a "problem" within a community, so a county with the highest numbers of opioid-related deaths between 2013 and 2017 that was nearest to the researcher provided a starting point for this project. Because the existing literature and previous studies suggest that combating opioid misuse is most successful at the community level rather than state or federal levels, a review of local public health initiatives was conducted to further narrow the study area from the county to neighborhood

scale. Then, an on-site qualitative analysis of the study area's built environment—its physical characteristics—was conducted using the CDC's Built Environment Assessment Tool (further discussed in Appendix A) to identify general themes, review of existing programs and plans, and general discussions with two local area officials. Quantitative analysis was used to contextualize the study area's demographics, economy, and opioid-related deaths. Based on these findings, three target themes were identified within the study area for intervention: Health and Safety, Housing, and Social Cohesion. Three goals were established for each target theme, intended to improve the conditions of the study area's built environment and mitigate opioid misuse. Additionally, a specific Focus Zone within North End was identified for each target theme to serve as a specific space in the neighborhood's built environment to implement these goals. The implementation matrix organizes the target themes, goals, projects, and priority level into a roadmap for the community to actualize the proposed recommendations of this research.

As with any research methodology, there are challenges and limitations with this research project. First, public participation is typically a part of the planning process. Given the restraints of time and resources for this research project, however, public participation was not possible. It is recommended that if the community uses this plan as a framework for action, it is advised to schedule opportunities for the public to be involved in the process by offering local knowledge, suggestions, and opinions about these proposed recommendations. Second, the public health data related to opioid misuse that was used to identify this research project's study area should not be understood as a direct observation of opioid misuse in that specific neighborhood. Rather, previous research about the selected neighborhood and discussions with two public officials (Public Health Strategist with Cerro Gordo County Public Health

Department and Principal Planner with the City of Mason City) were used to rationalize the study area. Thus, these recommendations are the product of general knowledge of the county's experience regarding opioid misuse (*Research Questions*) that is then considered at the neighborhood level (*Study Area*) that identified issues (*Target Themes*) and applied to specific areas (*Focus Zones*). Third, there is the potential for bias in this research because there were no audits involved in the data collection process. The conditions assessment of the study area's built environment are the opinion of one individual researcher. Fourth, there is a lack of scholarship between the profession of planning and its relationship to substance misuse, so the conclusions drawn in this research project may not be applicable to a larger region than the study areas themselves.

3.3: Site Visits

There were two in-person site visits conducted in Mason City's North End Neighborhood for the purposes of this research. The purpose of these site visits was to record a detailed first-hand account of the neighborhood's layout and built environment conditions that would confirm or dispute the neighborhood's secondary data. Photographs, handwritten notes, and audio recordings were collected while walking each block of the study area, using the BE Assessment Tool questionnaire as a guide for noting the area's physical conditions (Appendix A incudes a more detailed discussion of the BE Assessment Tool and how it was used in this research). The first site visit to the study area in Mason City's North End Neighborhood was conducted on Sunday, February 2, 2020. The main observations from that site visit include the prevalence of poor pavement conditions and general perception of neighborhood isolation. The poor pavement conditions in the study area were made especially evident from the standing

pools of water and muddy conditions from melting snow. The perceptions of isolation were evidenced by the frequency of dead ends, vacant storefronts, and lack of pedestrian traffic. The second site visit was conducted on Saturday, March 7th, 2020. The main observations from that site visit include the pronounced difference in housing characteristics on the North side of 12th Street (visibly more dilapidated by broken windows, damaged siding, and piles of trash) versus the South side (larger homes with neat landscaping and better building materials like brick and stone) and prevalence of pedestrian activity (more pedestrians and cyclists were observed on the North side blocks of 12th Street than the South side). Roughly speaking, these site visits compiled primary data about the physical conditions of the study area in which general issues could be extrapolated for further analysis and intervention development.

3.4: Vision Statement

The study area identified for this research – Mason City's North End neighborhood – has challenges and opportunities that can be strategically harnessed by the community to improve the conditions for the future. A vision statement functions as a future snapshot of what the neighborhood is expected to be like in the future if the neighborhood plan's outlined goals and objectives are implemented. The proposed vision statement for the North End is as follows: *This neighborhood is a resilient, substance-free area with safe infrastructure that promotes healthy lifestyles, attractive commercial space that provides business and employment opportunities, and engaged residents that encourage positive connections.*

3.5: Plan Framework

3.5.1: Plan Overview

This report outlines the most typical components of a neighborhood plan: a vision, goals, projects, and a plan for implementation. Although this plan is hypothetical, its structure is such that it may be adopted by the City of Mason City and realized in the North End study area, or it can easily be adapted to fit another neighborhood or community with similar characteristics. This type of organization uses the neighborhood's proposed vision statement as the "big picture" driving force for all the subsequent components, including the target themes, goals, projects, and focus zones, intended to improve the overall condition of the neighborhood's built environment.

3.5.2: Target Themes

The proposed vision statement recognizes three target themes for the goals and solutions of this hypothetical neighborhood plan: Health & Safety, Economic Development, and Community Cohesion (Table 2). These target themes are categories of built environment intervention strategies that, for the purposes of this research, will direct improvements related to mitigating opioid misuse. Health and Safety refers to the actual and perceived level of activity, wellbeing, and safety in the neighborhood. Indicators of health and safety in the built environment may include quality infrastructure (i.e. roads, sidewalks, utilities), services (i.e emergency response, food access, recreation areas), and land use (i.e, residential, commercial, industrial). Economic Development refers to the employment and commercial opportunities in the neighborhood. Indicators of economic development in the built environment include places of employment, commercial space (either occupied or available for occupancy), and any improvements intended to promote economic activity in a particular location (i.e. streetscaping, signage). Community Cohesion refers to the social connectedness between

residents, shared willingness to cooperate with and take responsibility for each other, and feelings of neighborhood empowerment and ownership. Indicators of community cohesion in the built environment include open public areas (i.e. community centers, green spaces, gardens), and public events and programs (i.e. neighborhood-wide block parties, clean-up campaigns, creative placemaking). These three target themes fail to address housing, which can be a useful area for intervention in terms of mitigating substance misuse. This exclusion is intentional, as the study area is primarily residential and requires intervention in the outlined target themes more than in the realm of housing.

Table 2: Target Themes and Indicators

TARGET THEME	DEFINITION	INDICATORS
HEALTH & SAFETY	*the actual and perceived level of activity, wellbeing, and safety in the neighborhood*	• **INFRASTRUCTURE** (roads, sidewalks, utilities) • **SERVICES** (emergency response, food access, recreation areas) • **LAND USE** (residential, commercial, industrial)
ECONOMIC DEVELOPMENT	*the employment and commercial opportunities in the neighborhood*	• **EMPLOYMENT** (area jobs and their locations) • **COMMERCIAL SPACE** (occupied and available) • **BEAUTIFICATION** (streetscaping, signage, public art)
COMMUNITY COHESION	*the social connectedness between residents, shared willingness to cooperate with and take responsibility for each other, and feelings of neighborhood empowerment and ownership*	• **OPEN PUBLIC AREAS** (community centers, green spaces, gardens) • **PUBLIC EVENTS & PROGRAMS** (neighborhood-wide block parties, clean-up campaigns, creative placemaking and marketing)

Source: Interface Studio 2017

3.6: Goals and Solutions by Target Theme

3.6.1: Health and Safety

GOAL: The neighborhood has safe infrastructure that promotes healthy lifestyles.

SOLUTION 1: Fix sidewalks that are broken or in poor condition within the neighborhood to increase pedestrian activity and accessibility.

SOLUTION 2: Eliminate or reduce the number of dead ends in the neighborhood to improve street network connectivity and air quality.

FOCUS ZONE: 1 - Poor Pavement and Dead End Areas (Figs. 8-11)

Figure 8: Severely damaged pavement found in Study Area

Source: Aspen Pflanz, March 2020

Figure 9: Poor drainage on sidewalks along N Federal Ave in Study Area

Source: Aspen Pflanz, March 2020

Figure 10: Dead End at N Monroe Ave and 8th St NW's Union Pacific Railroad intersection in Study Area

Source: Aspen Pflanz, March 2020

Figure 11: Dead End sign at 12th St NW and President Ct in Study Area

Source: Aspen Pflanz, February 2020

3.6.2: Economic Development

GOAL: The neighborhood has attractive commercial spaces that provide business and employment opportunities.

SOLUTION 1: Apply for grants and encourage façade improvements in the neighborhood to beautify available commercial space.

SOLUTION 2: Attract business to the vacant commercial spaces in the neighborhood to boost business and employment opportunities.

FOCUS ZONE: 2 - N. Federal Ave. Commercial Block (Figs. 12-15)

Figure 12: Vacant storefronts along east side of N Federal Ave in Study Area

Source: Aspen Pflanz, March 2020

Figure 13: Vacant storefronts and upper level housing along east side of N Federal Ave in Study Area

Source: Aspen Pflanz, March 2020

Figure 14: Vacant storefronts along west side of N Federal Avenue in Study Area

Source: Aspen Pflanz, March 2020

Figure 15: Vacant storefronts along east side of N Federal Avenue in Study Area

Source: Aspen Pflanz, March 2020

3.6.3: Community Cohesion

GOAL: The neighborhood has engaged residents that feel connected and empowered.

SOLUTION 1: Host free events in Monroe Park annually that bring neighborhood residents and the greater Mason City area community together to defeat negative neighborhood perceptions.

SOLUTION 2: Plant a community garden in Monroe Park to stimulate social interaction and increase food access in the neighborhood.

FOCUS ZONE: 3 - Monroe Park (Figs. 16-17)

Figure 16: Monroe Park from the southeast corner

Source: Aspen Pflanz, February 2020

Figure 17: Monroe Park from the northwest corner

Source: Aspen Pflanz, February 2020

CHAPTER 4: IMPLEMENTATION

4.1: Purpose and Organizational Structure

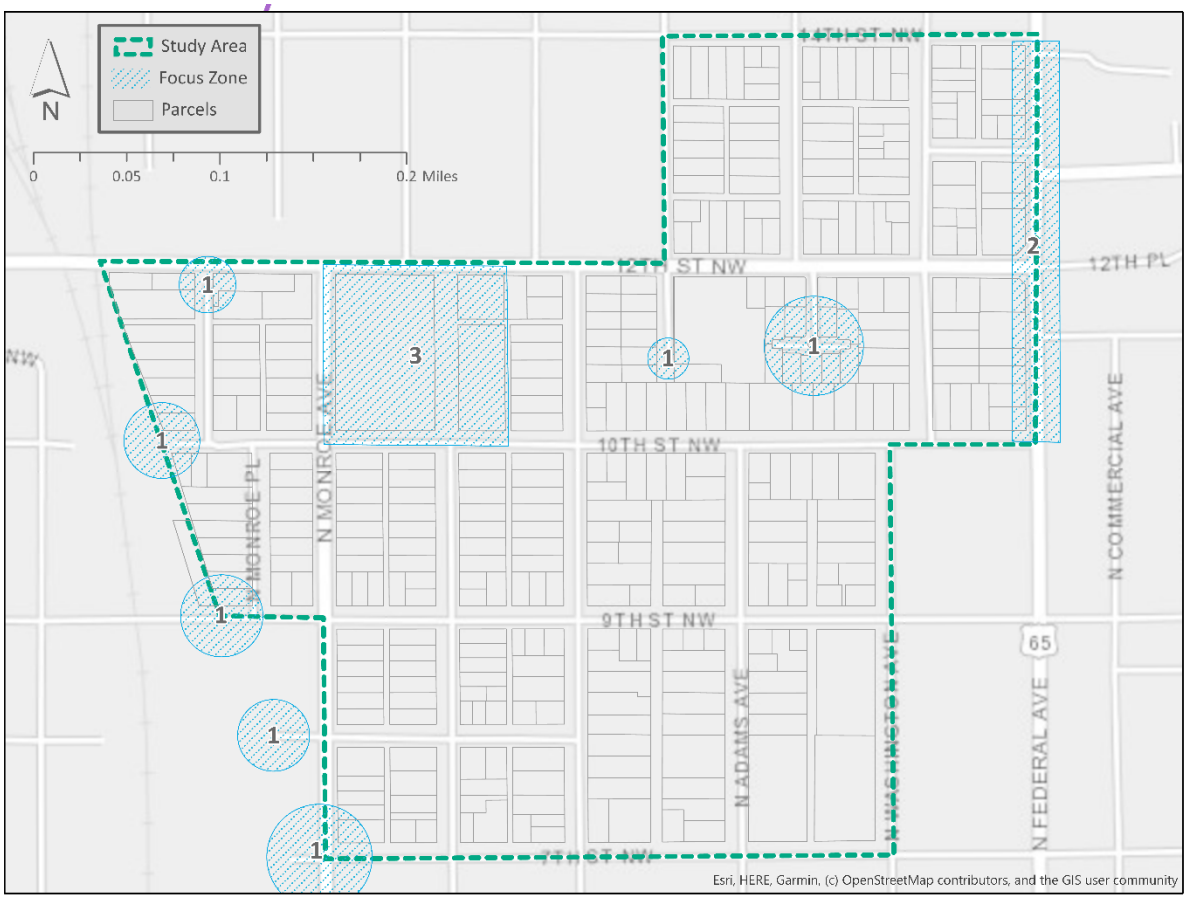
Plans are not useful unless they have an identified procedure for implementation. Developing target themes, goals, and focus zones into a neighborhood plan for the study area is just a starting point for guiding the community in their response to combating opioid misuse; the success of this neighborhood plan will be determined by its implementation. The conditions of the built environment that the goals of this plan address will certainly change over time. Properties change ownership, funding sources become available, economic factors shift, and priorities evolve. Existing buildings see investment, deferred maintenance, or abandonment. New structures are erected. All of these circumstances will affect this plan's implementation, so it is important to provide as much detail as possible in the implementation matrix so that the

responsible parties may adapt the schedule of the plan as needed without compromising the plan's overall vision. This plan's implementation matrix has a strong organizational structure that arranges specific project recommendations based on the research findings by Focus Area, includes a purpose, timeframe, potential partnerships, sources of funding and a priority level.

4.2: Focus Zones

Focus Zones (Fig. 18) are the next stage of the implementation process. The purpose of the Focus Zones strategy is to connect practical applications of the plan's goals to specific places within the study area's built environment. After carefully analyzing the study area's existing conditions, challenges, and opportunities through reviewing past and current planning initiatives in Mason City and Cerro Gordo County and conducting two site visits to the study area, three Focus Zones were identified and paired with a Target Theme and associated goals. Focus Zones provide a comprehensive roadmap for implementation that directs community action and involvement.

Figure 18: Study Area Focus Zones Map

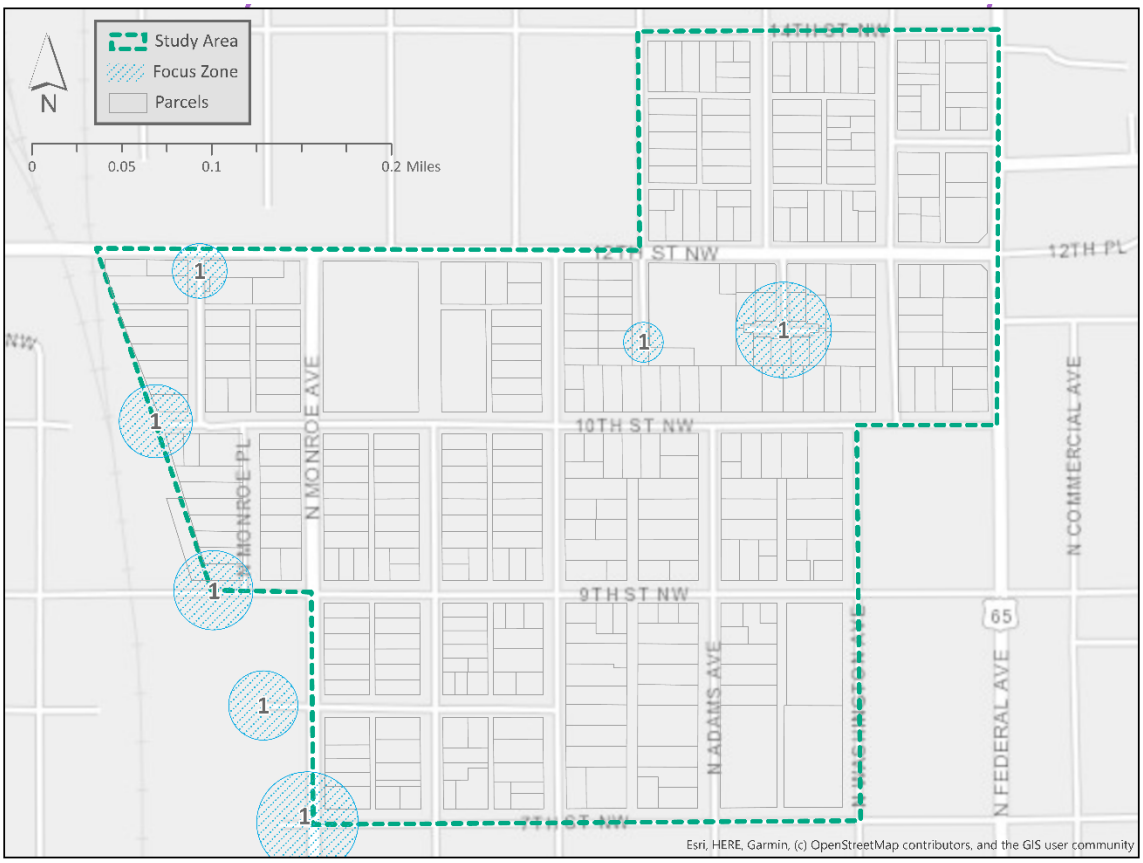


Source: Aspen Pflanz

It must be acknowledged that identifying physical improvements to the study area's built environment is just one piece of the coordinated efforts necessary for overall community change. However, these Focus Zones break down the neighborhood into smaller parts that may be addressed individually and, in time, result in larger community-wide improvements that could not be accomplished all at once. Successful completion of the recommended Focus Zone projects is intended to serve as a catalyst improving other components of neighborhood conditions, such as education, employment, and services that may mitigate opioid misuse.

4.2.1: Zone 1 – Health and Safety site

Figure 19: Focus Zone 1 – Health & Safety Site Map



Source: Aspen Pflanz

Zone 1 is composed of segments of sidewalks with extremely poor pavement conditions and dead ends in the neighborhood. Poor pavement conditions limit the walkability of sidewalks because they form hazards that are difficult for less able-bodied individuals to maneuver safely. As seen in Figures 8 and 9, these damaged sidewalks cannot drain water from wet weather properly, which nearly eliminates the accessibility of these paths. If an individual perceives their environment as unsafe or unsuitable for mobility, they are less likely to be active in this environment, which can decrease their physical health over time (CDC 2007). Moreover, dead ends physically reduce the connectivity of the neighborhood's street network and potentially affect an individual's perceptions of neighborhood safety. A 2008 study heeded that streets with less movement (i.e., cul de sacs or dead ends) are relatively closed-off and require

longer and more car-dependent trips. It also implied that limited connection to other street segments potentially advances crime in the area: "…robbery rates increase with the distance of the space from buildings […] and the number of connections for the line of sight on which the segment falls…" (Hillier and Sahbaz 2008). However, another study noted that although cul-de-sac residents are less likely to walk around their neighborhood, this type of neighborhood design may create a greater sense of social cohesion (Hochschild 2014). Isolation is a common theme identified in areas suffering from opioid misuse, so it is suggested that the physical isolation of poorly-connected streets in a neighborhood could alter the behaviors and choices of an individual, perhaps negatively.

4.2.2: Zone 2 – Economic Development site

Figure 10: Focus Zone 2 – Economic Development Site Map

Source: Aspen Pflanz

Zone 2 is a one-block stretch of commercial space along N. Federal Ave. (Hwy 69), one of the busiest roads in Mason City. This commercial area is composed of two- and three-storied buildings that are in poor physical condition and mostly vacant. This section of land is the only commercial zoning in the study area, which is predominantly zoned residential, so it is the most practical site for implementing new economic development strategies. As stated previously, Mason's City's North End has suffered from decades of disinvestment starting in the 1970s. This experience may be considered an example of community trauma – a disruption of healthy development that adversely affects relationships and conditions that may contribute to mental health issues such as substance abuse, domestic violence, or crime (Impact Services 2017). The effects of the study area's community trauma may be lessened through beautifying the available commercial space and indirectly reduce the misuse of substances since this type of physical intervention on the conditions of the built environment "…can have significant, positive population-level effects without conscious commitments by individuals for lifestyle changes" (Branas et al 2017). Furthermore, dilapidation and blight can result in negative outcomes for a person's perception of and physical safety, which can contribute to increased violence and fear in an area (Branas, et al 2017). It is therefore recommended that the physical components of these buildings be improved to reduce the likelihood of such negative activity in and poor opinions of the area.

4.2.3: Zone 3 – Community and Social Cohesion site

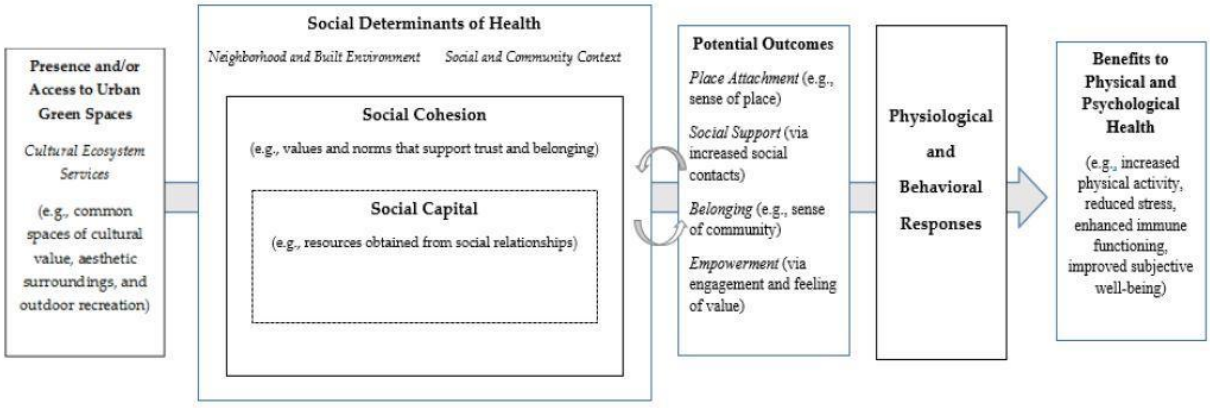
Figure 21: Focus Zone 3 – Community Cohesion Site Map

Source: Aspen Pflanz

Zone 3 is an existing neighborhood park that takes up a large city block. Monroe Park is nearly 6 acres of open space that includes amenities such as soccer goals, an asphalt walking track, a basketball court, playground equipment, restrooms, charcoal grills, picnic tables and benches, soccer goals, a covered shelter. 12th Street, which is confines the park to the north, is one of the busiest thoroughfares in the neighborhood. It serves as the only vehicle and pedestrian overpass for the Union Pacific railyard in the immediate vicinity. The park is in good condition, as there was no visible dereliction (e.g. litter, graffiti, broken equipment) observed during either site visit. However, this area could be better utilized and promoted as a space for prosocial community interactions and improve the area's overall sense of community. Examples of park features that may encourage prosocial interaction include "…open park design to

encourage active recreational activities, the availability of sidewalks, improved access to parks through quality transportation options, shaded areas that support relaxing environments, functional playgrounds, and the extent of organized activities" (Jennings and Bamkole 2019). It is important to promote better park design not only to connect people socially, but to improve their personal wellbeing. "The presence of positive social cohesion can also support health related behaviors such as decreased smoking, less alcohol consumption, and increased use of preventative healthcare services. Conversely, people who are socially isolated tend to be less healthy and susceptible to stress, depression, and cardiovascular issues," as conceptualized in Fig. 21 (Jennings and Bamkole 2019).

Figure 21: Social Determinants of Health flowchart



Source: Jennings and Bamkole 2019

4.3: Implementation Matrix

FOCUS ZONE	TARGET THEME	GOAL	PROJECT	PRIORITY
1	Health and Safety	*The neighborhood has safe infrastructure that promotes healthy lifestyles.*	Fix sidewalks that are broken or in poor condition within the neighborhood to increase pedestrian activity and accessibility.	!! Medium
			Eliminate or reduce the number of dead ends in the neighborhood to improve street network connectivity and air quality.	! Low
2	Economic Development	*The neighborhood has attractive commercial spaces that provide business and employment opportunities.*	Apply for grants and encourage façade improvements in the neighborhood to beautify available commercial space.	!!! High
			Attract business to the vacant commercial spaces in the neighborhood to boost business and employment opportunities.	!! Medium
3	Community Cohesion	*The neighborhood has engaged residents that feel connected and empowered.*	Host free events in Monroe Park annually that bring neighborhood residents and the greater Mason City area community together to defeat negative neighborhood perceptions.	!!! High
			Plant a community garden in Monroe Park to stimulate social interaction and increase food access in the neighborhood.	! Low

CHAPTER 5: DISCUSSION AND FUTURE RESEARCH

5.1: Summary of Findings

This research posed the following research questions: **1. *What is the relationship between the built environment and the opioid epidemic?*** and **2. *How can planners respond to the opioid epidemic in their communities?*** After conducting a thorough qualitative analysis, there are several connections, though nebulous, identified between the opioid epidemic and the built environment in Mason City's North End Neighborhood study area.

Planners can respond to the opioid epidemic in their communities in many ways. Because one of the primary roles of a planner is to organize partnerships, one response option that planners have is to work with the community's public health officials to track the presence of opioids. Establishing the scope of opioid misuse in the community provides a launching point for planners to develop strategies that can curb opioid misuse. Opioid misuse will never be entirely purged from communities, but its effects can certainly be reduced; planners must be willing to do their part. Ensuring that public health is integrated into planning decisions and planning is integrated into public health decisions is advisable. The relationship between these community subject areas should be recognized and emphasized; acting independently from one another diminishes their capability to implement healthier and safer communities for residents.

However, planning decisions can be incredibly complicated. Much of planning extends beyond the technical activities and into much larger social, economic, and environmental challenges. Within society at large the values of democracy, equality, diversity, and efficiency often clash (Fainstein & DeFillipis 2016). Planners must therefore heed this and approach problems within their communities comprehensively, including various stakeholders, identifying multiple solutions, and never lose sight of their primary obligation to protect and

serve the public interest, of course, being weary of the fact that this "public interest" changes over time as do those who benefit and those who lose. Planners are responsible for finding a balance for all of this in the communities they serve. There is no right or wrong way to practice planning in communities, but how planners practice does produce better or worse outcomes. Because opioid misuse continues to threaten communities around the United States, planners must assume their responsibility in combating this epidemic by considering their community's unique experience with it and taking necessary steps to address it.

5.2: Future Research Recommendations

This research project has only scratched the surface of the relationship between the built environment and the opioid epidemic. Scholars have and practitioners alike have concluded that there is indeed a connection between a community's health characteristics and the conditions of its built environment. However, these health characteristics have traditionally been framed towards physical health rather than mental health. Now that mental health issues are being considered more regularly in studies involving the built environment and its effects on community health, substance misuse, which undoubtedly affects one's mental and physical health, is being recognized as an increasingly important cause for and consequence of a community's built environment conditions. Research and reporting about the opioid epidemic, to be more specific to the subject matter of this research project, has also evolved from focusing on just medical and policy implications. Presently, the opioid epidemic is painted with a much larger context that considers the various indirect influences and impacts of opioids, including conditions of the built environment. Future research of how planners can respond to the opioid epidemic in their communities, and the actual actions taken to respond to it, will

likely be up to the public health and planning practitioners of communities. The most effective strategies for intervention will arguably be those that are as specific to the unique context of the community. Since local public health experts and planners are most familiar and equipped to investigate the details of their community, scholarly research certainly has its limitations in achieving positive differences for these communities.

If this research project were to continue or be replicated in the future, a few changes are suggested for improvement. First, this research project was mainly exploratory in nature and leaned on generalized assumptions about the study area's context instead of solid, clear evidence about the study area's experience with opioid misuse. Working more closely with Cerro Gordo County's Department of Public Health is necessary to accomplish this because they would have the most useful and accurate data about the reality of opioid misuse for the area. There are restrictions on this data due to privacy concerns, but these limitations may be overcome by following the appropriate research ethics protocol. Second, this research project should incorporate more public input since it is intended to establish interventions in the community. The public should always have an opportunity to contribute to and respond to any projects that affect their neighborhood, especially projects that are as personal as substance misuse. Events geared towards explaining the planning process and collecting information about the community's context is advised. Additionally, public input surveys are a sensible way to gather this information confidentially. Third, this research project could be improved by expanding the scope of intervention strategies to include a number of existing programs aimed at combating opioid misuse. Many federal, state, and local programs have already been established around the county for this purpose that intervene at various levels, which should be

utilized as fully as possible for communities organizing to eliminate the negative effects of opioids. Researchers and practitioners are typically constricted by funding and time, so in attempts not to "reinvent the wheel," a future research or community project about opioid misuse and the built environment should include a thorough search for existing programs that are available to and feasible for their situation. All in all, this research project is a good start to the research of the relationship between the opioid epidemic and the built environment as well as what planners can do to mitigate the negative effects of opioid misuse in their communities. However, there is much more to learn and explore going forward until widely applicable conclusions and recommendations can be made about the research questions posed.

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APPENDIX

A.1: Centers for Disease Control and Prevention (CDC) Built Environment Assessment Tool

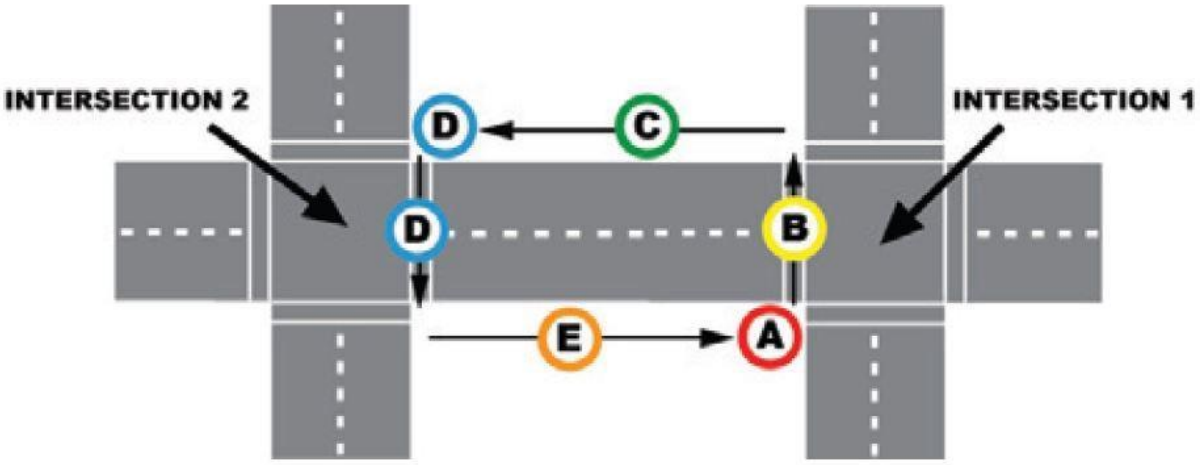
A.1.1: CDC BE Assessment Tool Overview

The Centers for Disease Control and Prevention's Built Environment Assessment Tool "…is a direct systemic observation data collection instrument for measuring the core features and quality of the built environment related to behaviors that affect health, especially behaviors such as walking, biking, and other types of physical activity" (CDC 2015). This tool does not assess every aspect of the built environment, but it identifies a core set of features that experts have agreed upon as the most relevant. These features include infrastructure (road type, curb cuts/ramps, intersections/crosswalks, traffic control, transportation), walkability (sidewalk/path features, walking safety, aesthetics and amenities), bikeability (bicycle lane/path features), recreational sites and structures, and the food environment (access to grocery stores, convenience stores, farmer's markets, etc.) (CDC 2015). Because public health practitioners contend that the built environment influences the behaviors of individuals and the policies and systems that impact their health, improving the built environment in a community is a trusted method of bettering its overall public health. There is no single process for measuring the built environment, but establishing baseline conditions is necessary to assess the needs and set priorities for improvements to an area's built environment. However, the BE Assessment Tool provides a useful method for collecting data about the conditions of the built environment that is thorough and adaptable for individual research needs.

The BE Assessment Tool assesses the built environment by splitting up a selected study area into individual street segments and collecting descriptive information through an intensive

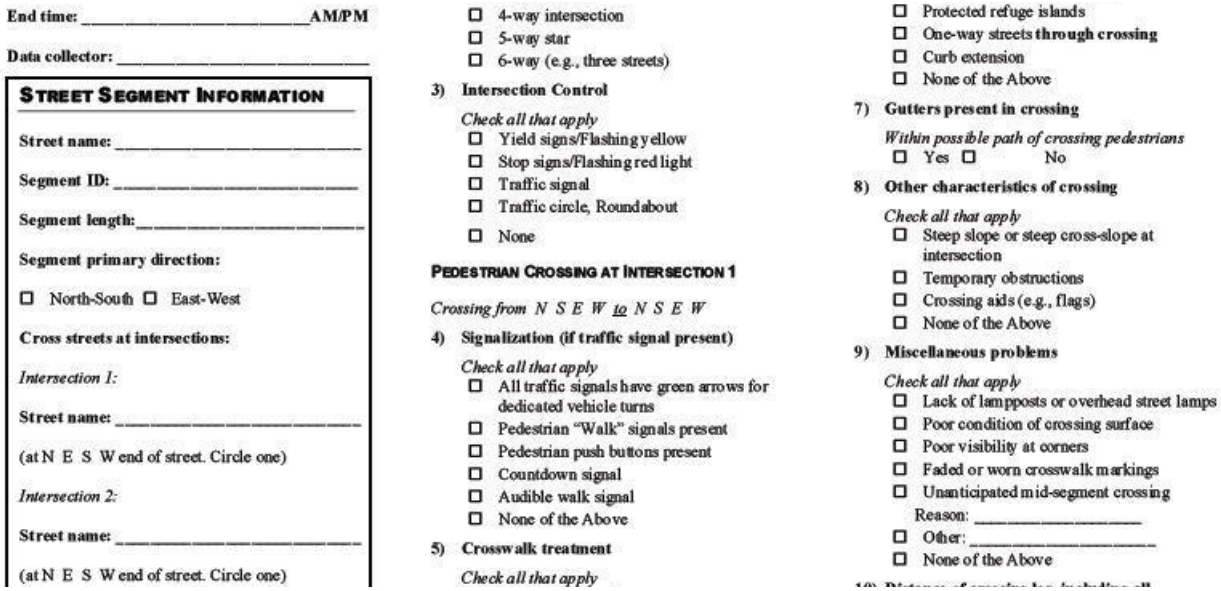
questionnaire about each segment's specific built environment features and their conditions. It is recommended that the researchers also record field notes and take photos of the street segments. There are many different ways to select street segments to assess; this research assessed street segments that were identified for recommended intervention through the review of the area's history and past and current planning initiatives. The direction of the data collection route depends on the type of street segments under investigation (e.g., segments along a commercial corridor, intersection, routes, around a single building, etc.), as seen in Fig. A.1 (CDC 2015). The questionnaire (Fig. A.2) consists of 81 questions that are answered by checkmarks (this streamlines the data collection process and aids in the objectivity of the scoring process). The data coding and scoring is organized in a tabular format that is simple to use. The table arranges the independent variables as columns and dependent variables (individual street segments' answers to the questions) as rows (Fig. A.3). Each marked checkmark for a question is considered to be a "Yes" and equals 1 point, and each unmarked checkmark is considered to be a "No" and equals 0 points.

Figure A.1: BE Assessment Tool Investigation Route Sample



Source: CDC 2015

Figure A.2: BE Assessment Tool Segment Questionnaire sample



End time: _____AM/PM

Data collector: _____

STREET SEGMENT INFORMATION

Street name: _____

Segment ID: _____

Segment length: _____

Segment primary direction:

☐ North-South ☐ East-West

Cross streets at intersections:

Intersection 1:

Street name: _____

(at N E S W end of street. Circle one)

Intersection 2:

Street name: _____

(at N E S W end of street. Circle one)

☐ 4-way intersection
☐ 5-way star
☐ 6-way (e.g., three streets)

3) **Intersection Control**

Check all that apply

☐ Yield signs/Flashing yellow
☐ Stop signs/Flashing red light
☐ Traffic signal
☐ Traffic circle, Roundabout
☐ None

PEDESTRIAN CROSSING AT INTERSECTION 1

Crossing from N S E W to N S E W

4) **Signalization (if traffic signal present)**

Check all that apply

☐ All traffic signals have green arrows for dedicated vehicle turns
☐ Pedestrian "Walk" signals present
☐ Pedestrian push buttons present
☐ Countdown signal
☐ Audible walk signal
☐ None of the Above

5) **Crosswalk treatment**

Check all that apply

☐ Protected refuge islands
☐ One-way streets through crossing
☐ Curb extension
☐ None of the Above

7) **Gutters present in crossing**

Within possible path of crossing pedestrians

☐ Yes ☐ No

8) **Other characteristics of crossing**

Check all that apply

☐ Steep slope or steep cross-slope at intersection
☐ Temporary obstructions
☐ Crossing aids (e.g., flags)
☐ None of the Above

9) **Miscellaneous problems**

Check all that apply

☐ Lack of lampposts or overhead street lamps
☐ Poor condition of crossing surface
☐ Poor visibility at corners
☐ Faded or worn crosswalk markings
☐ Unanticipated mid-segment crossing
Reason: _____
☐ Other: _____
☐ None of the Above

Source: CDC 2015

Figure A.3: BE Assessment Tool Scoring Matrix sample

				Section		Signage Positive Subscale	
			☐ None				
C1_1a	Yield signs No = 0; Yes = 1		☐ Yield signs/Flashing yellow			Intersection Control and Signage Positive Subscale	No = 0; Yes = 1
C1_1b	Stop signs No = 0; Yes = 1		☐ Stop signs/Flashing red light			Intersection Control and Signage Positive Subscale	No = 0; Yes = 1
C1_1c	Traffic signal No = 0; Yes = 1		☐ Traffic signal			Intersection Control and Signage Positive Subscale	No = 0; Yes = 1
C1_1d	Traffic circle No = 0; Yes = 1		☐ Traffic circle, Roundabout			Intersection Control and Signage Positive Subscale	No = 0; Yes = 1
Pedestrian Crossing at Intersection 1							

Source: CDC 2015

Due to the limitations of this research, not every part of the BE Assessment Tool or suggested procedure was used. The questionnaire was used as a reference guide to identify trends (meaning the questions were considered but not answered one by one), only one data rater was used, and no inter-rater reliability audits were performed. Furthermore, the data coding, scoring, and interpretation was adapted so that general descriptive analyses were established for the observed street segments rather than overall sums of ratings. Utilizing descriptive analyses instead of numerical summations of the built environment ratings helped identify specific features that are more meaningful and sensitive to the area's context, which

better inform decisions about improvements to the area. These adaptations to the BE Assessment Tool and process are not expected to significantly alter the conclusions of the analysis. Rather, these adaptations were intended to reduce the workload of the outlined data collection and analysis processes so that a single researcher could use the BE Assessment Tool without being overwhelmed and still form reasonable conclusions from the data.